KANSAS MEDICAL JOURNAL.

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ORIGINAL ARTICLES.

Diastase in Therapeutics.

BY C. C. FITE, M.D., NEW YORK.

Read Before the New York Medico-Surgical Society, January 4, 1897.

The sprouting of a seed was considered, until quite recent times, a great mystery; not until diastase was discovered could we properly understand why a seed after being placed in a moist soil began to develop into a plant after having laid dormant perhaps for years. Under proper conditions, the life endowed germ is no longer a sleeping unknown quantity, but it is an active principle and the process of development begins.

The sprouting of seed is a very interesting subject for scientific study—this awakening of the germ life, by the influences of heat and moisture, and the action of diastase in converting the starch of the seed into maltose, which afterwards becomes fibrous or celular tissue. We will not go into a discussion here in reference to the secretions by the plant of fluids which, acting through the delicate roots, absorb and utilize the soil elements; of the important work done by the leaves in taking carbon from the atmosphere; and by these and other processes completing the growth of the plant and eventually a reproduction of seed to continue the life of the species indefinitely.

Let us now leave the plant and refer to the important factor in the growth and development of animal life; the ptyalin of the saliva, a product analagous in many respects to diastase. Just as Nature places diastase in the grain to produce the changes leading up to a higher growth, so she gives animals ptyalin to convert the starch and perhaps other food into assimilable material for nourishment, for heat, and a reserve supply of fat. I use the words nourishment, heat, and fat, advisedly. The starch so converted is nourishment, and it is the basis of our coloric energy. Our supply of fat comes mainly from the starch changed into maltose by the ptyalin, supplemented by the pancreatic secretions, and it is changed to oil later on in the process. The oil is not only utilized for heat but stored in the tissues as a reserve supply.

It is well to bear in in mind that few carnivorous animals take on a great degree of fat; grain eating animals do. Give swine all the fat and oil they can eat, and they will not gain in weight half as quickly as when fed on grain alone.

The function of ptyalin is to correct starch into dextrin and maltose, this being preliminary step, and goes on in the normal stomach for from thirty to forty minutes, after the close of an ordinary meal, when the acid peptic digestion stops the diatasic process. The duodenum holding the pancreatic and other secretions takes up the partially changed starch and completes the conversion. We need not follow the process beyond this point.

It has long been observed that we do not get altogether satisfactory results in the treatment of amylaceous indigestion with pancreatic extracts. This is probably due to the fact that the amylopsin of the pancreatic juice and other various duodenal enzymes are intended more for completing and finishing the changes already begun by ptyalin before the peptic digestion supervenes, and are not adapted for this preliminary conversion in the stomach. In other words, they are not suitable for beginning the conversion

in the food mass found in the stomach—acting we might say on the mass later when it is an acid body, during the time it is being changed from an acid to an alkaline reaction, instead of on the alkaline or neutral mass when it is being changed into an acid mass. We see, therefore, that while pytalin and amylopsin are practically identical in their action on starches, Nature intends them to act under different conditions and at different periods of the digestive process. Therefore, we should not give pancreatic extracts with the expectation that they would render desirable service in the stomach, but we should rely upon either increasing the supply of ptyalin by slowly masticating the food, or by giving a ferment having similar properties to ptyalin; this we have in diastase.

From the discovery of diastase in malt, until quite recently, many attempts have been made to produce it in an isolated form economically enough to be used freely in medicine; without having to give it in the semi-solid malt extracts which have been the only reliable form readily obtainable by the profession, as the liquid malt extracts do not contain an appreciable amount of diastase. (See the *Boston Medical and Surgical Journal* for December 31, 1896, page 669.) The disadvantage in its use in malt extracts is that we have to give a large bulk of the extract to get a very small quantity of diastase; then too, the extract contains fermentable sugars and extractive matters which may not only be of no value, but may give rise to fermentation in the stomach or intestinal tract.

So far the only chemist, who has succeeded in producing an isolated diastase economically and on a large scale, is Jokichi Takamine, the Japanese chemist. (See the *London Lancet*, May 25, 1896.) This investigator received his scientific education at the Glasgow University. He devoted some years to the study of malting and the production of diastase and other ferments, and upon his return to Tokio was fortunate enough to find that Eurotium oryzæ was what he desired. The process he finally perfected is in brief as follows: The seed of the Eurotium is sown on moistened and sterilized wheat bran. The growth is rapid, and after the plant has reached maturity, he calls the bran with the growth on it "Taka-Koji." Upon examining this growth, under the microscope, it is found that the roots of the Eurotium which have penetrated the bran, are covered with crystals of pure diastase. These diastase crystals have the property of converting the starch of the bran for the nourishment of the plant. Takamine named the diastase so produced, Taka-diastase. In preparing this diastase for use in medicine it is necessary to get rid of the spore. This is done by percolating the Taka-Koji with water and adding to this solution of diastase, alcohol, when the diastase is precipitated and the activity of the spores destroyed. It is then a simple matter to further purify the diastase and preserve it in a dry powdered form indefinitely.

This diastase, owing I presume to it being an isolated substance, acts much quicker than the diastase found in the malt extracts. It will convert 100 times its weight of starch in ten minutes under proper conditions, if the process is continued for three hours, 1,500 times its weight. It is therefore evident that its amylolytic converting power is quite marked, and the theoretical position that it would prove of value in the treatment of amylaceous indigestion has been verified by careful observers many times over.

Prof. Leo, of Bonn, claims that this diastase exerts its action in a higher degree of acidity than was first claimed by those who had experimented with it, and that it is, therefore, superior to ptyalin in its starch-converting power. He has employed it with benefit in cases of deficient salivary secretion, as also in hyperacidity of the stomach.

Dr. W. S. Cristopher, of Chicago, (*Therapeutic Gezette*, March, 1896), holds that influence is due to micro-organisms which attack unchanged starch and give rise to fermentation, and that it is therefore important in these cases to predigest the starch in the stomach, and the more complete this process, the less food there is for the micro-

organisms to act upon in the duodenum. He finds that the administration of diastase in these cases gives satisfactory results.

Dr. R. W. Wilcox, of this city, has given very close attention to the therapeutics of this question, as shown by the papers he read some months ago. One before the N. Y. State Medical Society, January 1896, and one before the N. Y. Academy of Medicine, February 18, 1896. Both papers being published in the *Medical News*.

Other favorable clinical reports which have attracted my attention which may be mentioned here are—in the Journal of the American Medical Association for August 15, 1896, by Dr. T. H. Allen; in the *Medical Age* for July 25, 1896, by Dr. F. Spencer Halsey; and in the *Therapeutic Gazette* for September 15, 1896, by Dr. Wm. A. Walker.

In the practice of some friends, who have reported the matter to me for elucidation, this form of diastase seems to have other properties than its action on starch. In one notable case in which pepsin and other methods of treatment failed to give any benefit, although every symptom and test seemed to indicate that it was an undoubted case of albuminous indigestion, the result was not only palliative but curative. I have endeavored to have this matter settled by laboratory experiments, but so far the results have not been entirely conclusive, so any theory on this question for the present must be based mainly upon clinical evidence. This diastase does, as was shown by the experiments referred to, *disintegrate* albumens, but the proteolytic action *apparently* stops short of the production of albumoses and peptones. As to what takes place in the intestinal tract, of course we cannot yet say. It is altogether probable that the benefit in these cases is due to the promptness with which the first period of digestion is carried on and the conversion, instead of the fermentation of the starchy foods, leaving the second process, the acid peptic digestion, to go on normally without being interfered with by deleterious products, and the partial disintegration above referred to doubtless promotes the activity of the gastric juice by giving it freer access to the particles of albumen.

We should always bear in mind that we have from thirty to forty minutes after the close of an ordinary meal in which the action of ptyalin or diastase will continue before the acidity of the stomach contents reaches the point at which such converting power is impaired or destroyed. The proper theory for the administration of diastase is that it supplements the ptyalin of the saliva, and the more thorough the preliminary digestion in the stomach, the less work there is to be done in the duodenum. The formerly prevalent theory that pancreatic extracts and diastase ought in some mysterious way to find their way through the stomach into the duodenum, and there begin their work, is too absurd to be entertained. (See Dr. Walker's article above referred to.) I am indebted to Dr. Henry Dwight Chapin for information in this connection (*New York Medical Journal*. September 16, 1893), the results of some elaborate experiments which he had made in the Post-Graduate Laboratory in 1893. The experiments were made with a product containing diastase; the stomach was washed out and after the subject had been properly fed the diastase was administered in certain cases, omitted in others. The report made to Dr. Chapin by the chemist in charge of the work was, that, when the stomach was emptied forty minutes after the administration, the percentage of food remaining in the stomach at this time averaged, when diastase was not given, 25.02 per cent; with diastase, 29.2 per cent. This showed very conclusively the action of the diastase in the stomach. An analysis of the solid food remaining in the stomach showed that when diastase had not been administered, 7.02 per cent. were dissolved; when it was given, only 3.45 per cent.

Experiments with diastase have not up to this time been as satisfactorily conducted as those made with pepsin, for the reason that diastase is a sensitive body, and the value of any laboratory or test-tube experiments are apt to be contradictory, unless proper precautions are preserved as to the degree of heat used, and the various brands of starch

found in the market vary in reaction and in their sensible properties. It is to be hoped that we will soon have definite tables in use for this work, so that all experiments being make by a uniform standard, the results can be more readily compared and studied.

I might add in conclusion that the theraputic properties of diastase have not yet been as thoroughly investigated as could be desired. A good deal of careful work is now being done by investigators in this and other countries, and I am confident that the literature of the subject will be enriched very greatly in the near future.

So far little has been done with diastase in practical medicine beyond its use in typical cases of amylaceous indigestion. What we may expect in its employment in partially converting the starch of barley water for infant feeding remains yet to be determined, but I am very hopeful of its use in such cases. The fact of the casein of cow's milk being so much more dense and liable to form tough curds than human milk, has led me to hope that if we partially convert the starch of the barley water it will become not only a mechanical diluent for milk, but a readily absorbable food as well, which will nourish and not give rise to fermentation and flatulence.

Some time since I witnessed several experiments in bread making made by Mr. C. Von Egloffstein, then of Yonkers, now of Brooklyn, N. Y., to determine the value of diastase in rendering bread more soluble. His conclusions were that the soluble matter in ordinary bread in water at a temperature of 100° F. represented at the end of an hour 15 per cent. whereas when a proper amount of a product containing diastase was added to the bread before baking the soluble matter under the same condition was 40 per cent.

It is more than probable that diastase will play an important part in the therapeutics of the future.

(Since this paper was written, I have been informed by Mr. F. A. Thompson, a skillful Detroit chemist who has given close attention to this subject and performed a number of elaborate experiments with diastase and other digestive ferments, that he has found that Taka-diastase does undoubtedly, not only disintegrate albumens, but produces albumoses and peptones as well. This is an important and interesting discovery, and perhaps confirms the work of the German chemist, Bezanes, who found that in producing diastase from malt, a by-product which he named peptase, was formed, which acts on albumen. It is therefore evident that as there is formed in grain a product to change the albumen of the grain as well as the starch converting ferment, so the Eurotium has a ferment similar to peptase for converting vegetable albumen for its nourishment. The peptase produced in malting is extremely slow in its action, due perhaps to its being interfered with by the thick gummy malt product.)

Some Serious Effects of the X-Ray.

BY AGNES McKEE WALLACE, M.D., TOPEKA.

Having in my care a patient whose condition led me to suspect renal calculi, and hoping to verify the diagnosis, on April 14, 1896, I took her to Lawrence, where, through the courtesy of Professor Blake, she was submitted to the test of the Rœntgen ray.

Up to this time the pulse had ranged from 70 to 85, the temperature normal, and the attacks of renal colic had occurred about once a month.

She was placed upon a table beneath the fleuroscope, with the ray penetrating the body in the region of the kidney, in which position she remained one and one-half hours, expressing no discomfort or weariness from the ordeal, and with no apparent ill effect except that the pulse rose from 85 to 108.

On the evening of April 15 she had a severe attack of renal colic, to subdue which it required 1½ grains of morphine and two ounces of chloroform, administered at intervals. From this time on the attacks of renal colic were frequent, finally occurring as often as every third day and with increasing

severity. The pulse was never lower than 90, and most of the time ranged from 100 to 120, with always temperature of 101° and higher, occasionally to 104°.

That the effect of the Rœntgen ray was to hasten degeneration, I feel convinced. I am also led to believe that long or repeated exposure to this ray would have a deleterious effect upon the nervous system, from the fact that during the time of this test, from standing in close proximity to the fleuroscope, my own heart's action became so rapid that I found it necessary to leave the room at two different times, and the pulse of all those who were working about the instrument were also very rapid.

Benzosol in the Treatment of Intestinal Tuberculosis, Secondary to Pulmonary Phthisis.

Dr. Kofron of Cleveland, in the *American Therapist*, outlines the case of a musician, aged 21, whose tuberculous affections appeared to date back two years. For five months, diarrhea with pain in the abdomen, flatulence and tenesmus had progressed so that he had often found it necessary to cancel engagements on this account, and because of the feverishness that came on in the afternoon, lasting until 11 or 12 o'clock at night. In January, 1896, he had a severe hemorrhage from the lungs, losing at least a pint of blood; this recurred in about two weeks, when he lost about two pints of blood, and was obliged to stay in bed for three weeks. After leaving his bed he found that he had lost 30 pounds in weight; was very weak, and was unable to follow his occupation. The annoying diarrhea and severe cough also continued. The physician previously in attendance examined the sputum and stated that tubercle bacilli were numerous. He took a good many creosote capsules, which had but little effect on the diarrhea; each movement was still accompanied with the passage of flatus and some tenesums. Benzosol was begun in April, in four grain doses every four hours, and continued with apparent results for one week. He reported on May 8, and thought he was somewhat better, as he did not pass so much gas when his bowels moved, although loose passages still continued. He then ordered benzosol, five grains four times a day, for one week, and after that five times a day; he had to report in three or four weeks, or if worse to return sooner. He reported June 19, and said that he was getting well; it had not been necessary to come before. Now his bowels move once or twice a day, and almost a natural movement without pain and very little gas; his appetite was greatly improved and his cough had become less severe, and he expectorated but very little; the powders of benzosol four times a day, were continued. In July he was able to resume his work at playing the violin, filling four engagements each week, and stood the work very well. In September he complained that his bowels were again loose, and wanted to know if he could not take some other medicine instead of the benzosol powders. To satisfy him and as a control-medication, this remedy was discontinued and an emulsion of cod liver oil was prescribed. He returned October 1, saying that the diarrhea was even worse, the movements were frequent and the pain, flatulence and tenesmus had returned. He reported one week later, that he was decidedly worse, his bowels being looser than ever. He was again put upon benzosol, four grains four times a day, Dover's powder, five grains at bed time and a strict diet. He reported in October and November that he was again improving, and as well as he was before, being able to fill his musical engagements, with either violin or trombone every evening, in some weeks. The writer is persuaded that the treatment by benzosol has been the agent effecting the marked improvement in the patient's condition.

LORD LISTER is the title which Sir Joseph Lister has assumed, and not Lord Kinnear, as was announced by the cable at the time of his elevation to the peerage. The name of Lister has been made too noble by noble deeds to be laid aside for any other.

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Topeka, Kansas, Saturday, Feb. 13, 1897.

IN ancient times the methods of cure and the various operations which were performed were kept secret from the populace because the physicians of that day were priests and their secret accomplishments added much to the influence and authority of the church. If this same secrecy had been maintained by the medical profession it would be one of the most powerful bodies of men on the earth. Its influence over the people would be greater than that of the Pope, for the preservation of life is in most minds paramount to the preservation of the soul. It is an unpleasant fact that the medical profession of today is the most insignificant so far as government or legislation is concerned. It is not recognized upon its great humanitarian principles, and from a scientific standpoint it has small influence with the general public. Legislation for the benefit of the medical profession is of less importance to the average member of the Legislature than any other class. The present Kansas Legislature may be an exception to this rule, but we doubt it very much. The anatomical bill was killed by the Senate committee, and it is not at all unlikely that the practice act will meet the same fate. We would suggest that those who are interested in either of these measures take occasion to spend a day or so in the Senate lobbies and do a little careful talking.

PRESIDENT LUTZ, of the Missouri State Board of Health, says that the recent decision of the Supreme Court will make Missouri the dumping ground for quacks, charlatans, and imposters of every species, that make a show of practicing medicine.

DR. PILCHER, of Winfield, familiar to Kansas people on account of the castrations at the Winfield Asylum, has been in the city sometime, and we understand is a candidate for his old position.

A NUMBER of the Topeka physicians will spend part of next week in Alma in attendance upon the court. The "grave robbery" cases against the Kansas Medical College are on docket there.

DR. ROBERTS, of Kansas City, Kas., was in the city last week lobbying for the anatomical bill. Dr. Roberts is a member of the College of Physicians and Surgeons.

THE New York *Medical Record* is against the control of phthisis patients by the health board of that city.

DR. M. R. MITCHELL, city physician, is confined at home with jaundice.

Epilepsy Associated With Asthma.

In a recent number of the *Comptes Rendus de la Societe de Biologie*, Charles Fere reports a case of asthma associated with epilepsy. The patient was an individual of 48, with a family history of rheumatism and asthma in his father, who began to have typical attacks of nocturnal asthma at 30. As he became older there was gradually added to these a feeling of anxiety and distress. He would wake up feeling that something unusual was going to happen, but could not say whether the feeling was one of terror, anger or astonishment; he simply felt oppressed, and at the end of some time became unconscious. During this period of unconsciousness he became wildly delirious, the delirium lasting some hours. On waking the next morning he remembered nothing of his previous night. Later these crises appeared in the daytime, and he finally succumbed in one of them. His son, the patient's brother, yet living, is subject to attacks of delirium, coming on suddenly in the night, always about the same time, and consisting of an outpouring of expletives against imaginary persons, followed by loss of consciousnsss.

The patient himself had convulsions at the time of his first dentition. From the age of 4 years he had attacks of migraine, accompanied by convulsions at times. At 9 he began to have nocturnal epilepsy, always coming on at the same time, succeeded by chilly sensations, and followed by expectoration and profound sleep. At 16 he had a sharp attack of epilepsy, and since this time his asthmatic attacks have alternated with attacks of epilepsy, coming on at the same time of night, and occurring in the form of sensations of fear, followed by loss of consciousness. At the same time he became subject to daily paroxysms consisting of temporary loss of memory and attacks of unconsciousness of the petit-mal type, accompanied by chilly sensations, with the presence of "goose skin" and palmar hyperidrosis. Fere remarks that he has seen attacks of a similar nature to the latter in hysteria without loss of consciousness.

The Transplantation of Ovaries.

Medical Review of Reviews.

"Dr. Knauer (*Centrlblt. f. Gyn.; Medicine*), under the direction of Professor Chrobak, has conducted a series of experiments upon rabbits. Four rabbits were anæsthetized with ether, and under strict aseptic precautions their ovaries were removed and transplanted to other parts of their bodies. They all stood the operation well, and lived for varying periods afterward

"In two rabbits the ovaries were planted as follows: One in the cornu of the uterus, and the other between the fascia and muscles of the abdominal wall. Unnecessary handling of the ovaries was avoided, and the sutures were passed through the covering and not into the ovarian tissue.

"Since the operation three of the rabbits have died of intercurrent disease—the last one six months after the transplantation. The post mortem showed the ovary in the abdominal wall to be atrophied, but still living and readily distinguishable. The ovary implanted in the cornu uteri had not atrophied to the extent of that in the abdominal wall; upon its surface two Graafian follicles were readily recognized, one of them being of unusually large size, and resembling a vesicle filled with blood. The microscopic examination showed that this ovary had been abundantly nourished, and was performing its function. In the stroma were imbedded a large number of follicles in various stages of development.

"In all of the rabbits thus far examined the results have been the same, namely, that the ovaries in the rabbits can be transplanted to other localities remote from their normal places; they can be successfully implanted in muscular tissue, as well as in the peritoneum; that ovaries thus implanted are not only nourished, but perform their functions, namely, to develop, mature and expel ovules.

"Whether transplanted ovaries can be nourished and perform their functions for a long time, and whether ovaries can be transplanted from one individual to another, will be the subject of another report."

The Treatment of Headache by the Administration of Methyl Blue.

The Therapeutic Gazette.

Leroy (*Berliner Klin. Woch.*,) concludes from the study of a limited number of cases, that we possess in this drug a very active remedy in certain forms of disease, and that it is capable of not only relieving but permanently curing pain which has resisted all other methods of treatment.

The disorders which, according to his observation, are most amenable to the methyl-blue treatment, are habitual chronic neurotic headache and angeiospastic migraine. The amount prescribed was one and one half grains four times daily; in general, fifteen grains sufficed for a cure; in certain cases the treatment had to be repeated after a week's interval. Bladder irritation was prevented by using, as Ehrlich suggested, an equal amount of powdered nutmeg with each dose.

The drug was taken readily by the patients. with one exception, and the only objectionable feature was the dyeing of the urine a dark blue or green. In habitual headache—that is of the pure nervous type, and not symptomatic of some other disease—the author says methyl blue is of exceptional value, and that in the cases he observed it acted like a specific, not only relieving the pain but curing the pathological condition.

In a case of angeiospastic migraine, four and one-half grains of the methyl blue, given in three doses, two hours apart, at the onset of the attack, prevented its oncoming. If the dose was not given until the height of the attack, the patient vomited it, and no benefit accured. Given at the proper time it was always effectual, the pain remaining very slight, and disappearing entirely by midday. Besides this immediate effect, the methyl blue produced a further good result: the attacks have become less frequent, and now come on only once in three months.

The author who details a case of pyelonephritis in which the administration of methyl blue seemed to give remarkably good results; there was a large amount of pus in the urine, and the patient had passed a number of renal calculi, while a large tumor was present in the region of the right kidney. Heart lesions contraindicated operation, and the treatment with methyl blue was tried. The urine was deeply colored, but no trace of color was found in the pus-cells or their nuclei, nor were the numerous forms of bacteria colored. The renal colic was cured, and after the stoppage of the medicine the pus gradually continued to decrease and was only slight in amount. The tumor can no longer be felt. This may be a case of spontaneous cure, but the methyl blue may have had an effect also. The author would himself employ this form of treatment in another similar case. It is worthy of note that the methyl blue had no serious effect upon the weakened heart, and, if anything, seemingly benefited the cardiac condition.

The author would recommend the use of this drug in cases of angeiospastic migraine, in neurasthenia, and especially in cases of pure nervous headache; he, however, does not believe it should be used until all other known remedies have proved unavailing.

Schindler (*ibid.*) calls attention to the fact that the above paper of Leroy is not the first clinical observation upon this subject, and that he, together with Guttmann, made a far greater number of clinical observations upon this subject, which were published in 1892. They called especial attention to the remarkable results obtained in pure nervous headache and in migraine. The prompt action of methyl blue in these remote affections of the head is in accord with its action upon neurotic and rheumatic disease in other portions of the body. In a *resume* of the former article this author says: "Methyl blue is a good remedy, especially in headache of a purely nervous nature and in uncomplicated neuralgic and rheumatic pains of the lower extremities of the truuk. A comparison with the other anti-neuralgics would seem to favor methyl blue. In drunkards and in neuroses which have as their basis pathologico-anatomical alterations, methyl blue has, of course, no action."

The author does not believe that Leroy's

article loses in worth because it loses priority, but is rather of value in being a second observation confirmatory of the action of this drug.

The author has found the drug useful in treating ischiatic inflammations. A patient who had suffered for thirty years was relieved, and has had no relapse, after a dosage of seven and one-half grains daily for ten days. The drug may also be employed in relieving the pains accompanying pleuritis, bronchitis, and other affections of the lungs.

The author warns very strong y against an individual predisposition of idiosyncrasy on the part of some patients for this drug; and although, in the majority of cases, a daily dose of fifteen grains can be readily borne, there are cases where serious though not dangerous symptoms are produced. The mild symptoms are: weakness in the limbs, paresthesia, mental prepossession, giddiness and desire to vomit. There is no fever, collapse, or change in nutrition, and no derangement of the stomach. Large doses produce more marked symptoms of irritation, but so far have given rise to none that are dangerous. The drug is harmless in small doses, and effectual, while it is not dangerous, in large doses.

Shortening the Round Ligaments; Its Indications, Technics and Results.

George M. Edebohls, M.D., in The American Gynecological and Obstetrical Journal.

Dr. George M. Edebohls gave a very exhaustive and valuable resume on the above subject.

The paper deals exclusively with extraperitoneal shortening of the round ligaments. Its superiority over the intraperitoneal and vaginal methods, as claimed by the author, are:

1. That it is the most *physiological* procedure, both as to its plan and results.

2. That it does not interfere with the *function* of the uterus in childbearing and childbirth.

3. That the *mobility* of the uterus remains unimpaired.

4. That equal permanence is secured as to results without the formation of abnormal intraperitoneal adhesions.

Indications for the operation:

(*a*) In all uncomplicated cases of retroversion, retroflexion and excessive mobility of the uterus requiring operative treatment.

(*b*) In cases of aggravated anteflexion when the fundus lies below the level of the internal inguinal ring.

(*c*) In cases of retroverted and anteflexed uteri.

(*d*) In simple prolapse of the ovaries without adhesions.

(*e*) In cases of adherent retrodisplaced uteri, with or without adhesions of tubes and ovaries, these organs being otherwise in condition to call for an attempt at their conservation. The adhesions in these cases are first to be separated by means of anterior or posterior colpotomy, median cœliotomy, or by an incision through the peritoneum, at the internal inguinal ring, large enough to admit one or two fingers,

The author does not believe shortening of the round ligaments to be the best operation for prolapsus uteri He employs ventral fixation, in preference, as an adjuvant to plastic work upon uterus, vaginal walls and perineum for the relief of such condition.

The long incision is favored.

To find the round ligament: The external inguinal ring is now either exposed to view or located by the touch. A grooved director is inserted through the external ring and passed along the inguinal canal, directly behind the aponeurosis of the external oblique, until its point is over the site of the internal ring, cutting upon the director exactly in the direction of the fibers of the external oblique aponeurosis. Generally, the round ligament is well covered and entirely hidden from view by the internal oblique muscle and an investment of fatty, areolar and fibrous tissues. Retract, therefore, the internal oblique muscle upward and inward; then take two small blunt hooks, one in either hand, and sweep one of them, point downward and outward, along the posterior and outer walls of the canal from the depths of the wound skinward, hooking

up the entire contents of the canal. By tearing these contents apart, more or less, the round ligament will be found accompanied by the ilio inguinal nerve, and can be followed along the canal to the internal ring.

Care must be taken not to divide or tear the ilio inguinal nerve in separating it from the round ligament which it accompanies in the lower end of the canal.

A perusal of the various methods of performing the operation is then given, followed by a precise description of the writer's method, which is substantiated by sound reasoning. His technique is as follows: After the usual thorough preparation of the patient, and sterilization of the field of operation, first an incision is made the entire length of the canal, *e. g.*, from the internal ring to just within the pubic spine, a little above, and parallel. The ligament, freed from its surroundings in the canal, is next grasped by the thumb and forefinger of the hand, and cautiously drawn out at the internal ring, traction being made perpendicularly to the surface of the abdomen. A cuff of peritoneum is seen to closely surround the cord as it is drawn out; this is carefully stripped back into the abdomen; the opposite round ligament is then sought for and isolated. By alternating traction upon the ligaments, the fundus uteri should be recognized by the operator's fingers placed on the abdomen, immediately above the pubis. The parts of the wound are now brought together, precisely as in a Bassini operation for the radical cure of inguinal hernia. Forty-day chromicized catgut is used as suture material, and the round ligament is anchored in the floor of the wound by sutures, which include the internal oblique and transversalis muscles, the round ligament, and the shelving process of Poupart's ligament.

The Ideal Sterilization of Catgut.

Professor N. Senn, M.D., in Medical Mirror.

The ideal sterilization of catgut consists in rendering the material not only sterile but also mildly antiseptic without impairing its strength. Every surgeon has been anxiously looking for a method by which catgut could be prepared so that it could be sterilized by boiling without impairing its strength. Fortunately this hope has at last been realized. Experiments have shown that catgut and leather immersed for forty-eight hours in a 2 to 4 per cent. solution of formalin undergo an unknown chemic change which alters their texture in such a way that its tensile strength is not impaired but rather increased by boiling. The commercial catgut is subjected to the action of the formalin without any previous preparatory treatment of the raw material.

Hofmeister, who has done such excellent service in perfecting the formalin preparation of catgut, gives the following most recent method:

1. The catgut is wound on a glass plate with slightly projecting edges, so that the gut is free from the sides of the plate and exposed to the circulation of the boiling and flowing water. The ends of the gut are fastened through holes in the plate.

2. Immersion twelve to forty-eight hours in aqueous solution of formalin 2 to 4 per cent.

3. Immersion in flowing water at least twelve hours to free the gut from the formalin.

4. Boiling in water from ten to thirty minutes is amply sufficient, as all microbes and spores are killed by exposure to boiling heat for that length of time.

5. Hardening and preservation in absolute alcohol containing 5 per cent. of glycerin and one-tenth of one per cent. corrosive sublimate.

Experiments on animals with catgut thus prepared have proved that it is absorbable, though not as quickly as the ordinary material. One of the essential conditions of success in this method of catgut sterilization is to wind the gut quite tightly around the glass plate or hollow glass cylinder during the progress of sterilization.

The first attempts to sterilize catgut by this method under my own direction were made at the St. Joseph's Hospital by the sister in charge of the operating room. The result of the experience has led us to modify

the procedure in several ways. Instead of glass plates or linary abdominal glass drainage tubes have been employed, upon which the gut is wound quite tightly. These glass drains have been found an excellent substitute for the plates. An ordinary large test tube would answer the same purpose. The remaining directions given by Hofmeister were followed to the letter.

Numerous inoculations with fragments of catgut prepared by this method in sterile gelatin invariably gave negative results. The catgut is as strong as the raw material, hard, and the knot is less liable to slip than when the ordinary material is used. We have also ascertained that the formalin catgut may be reboiled almost any number of times without impairing its strength. Catgut to be safe should not only be absolutely sterile, but should contain a sufficient quantity of efficient antiseptic to render it unfit as a culture medium for pathogenic microbes. Hofmeister renders it antiseptic by immersing it in an alcoholic solution of corrosive sublimate. Others have substituted carbolic acid for sublimate. Both of these antiseptics unduly irritate the tissues and increase the primary wound secretion, effects which cannot fail in interfering to a certain extent with an ideal healing of a wound by primary intention. The experiments made recently by Lauenstein leave no doubt that it is almost next to impossible to render the field of operation absolutely aseptic by any of our methods of disinfection. We are forced to admit that nearly every wound inflicted by the surgeon's knife contains microbes, notwithstanding that the strictest aseptic precautions may have been carried out. The experiments made by Ewald have also furnished positive proof that sterile catgut often contains a sufficient quantity of an unknown toxic substance which by its destructive action upon the cells engaged in the reparative process transforms them into pus corpuscles, resulting in the production of a limited aseptic suppuration and the formation of sterile pus. Undoubtedly many of the stitch abscesses which occur in the practice of painstaking aseptic surgeons have such an origin. These experimental researches force upon us the conclusion that catgut should not only be sterilized, but that it must be made sufficiently antiseptic to at least inhibit the growth if not destroy the pyogenic microbes which enter the wound during the operation or which may reach it later through the circulation. In this part of the preparation of catgut I have modified Hofmeister's method by substituting for the corrosive sublimate iodoform. After boiling the deformalinized catgut for twelve to fifteen minutes it is cut into pieces of desirable length, tied into small bundles containing from six to twelve threads, when it is immersed and kept ready for use in the following mixture:

Absolute alcohol 950, glycerin 50, iodoform (finely pulverized) 100. The alcohol dissolves part of the iodoform. The bottle containing the catgut should be closed with a well-fitting glass cork and should be well shaken every few days to bring the dissolved iodoform in contact with the threads. The catgut can be kept in the mixture for any length of time without losing its strength. One of the valuable properties of iodoform applied to a recent wound is to diminish the amount of primary wound secretion. It does not destroy pus microbes, but inhibits their growth. I have used catgut prepared by these modifications of Hofmeister's method with the most satisfactory results, and shall continue to use it until some better method is devised.

In conclusion I would advise hospital authorities and surgeons to prepare their own catgut by this or similar processes, and not rely upon manufacturers for their supply.

Incision of the Pericardium for Purulent Pericarditis.

Dr. H. Bohm, in the *Deutsche Medicinische Wochenschrift*, gives a *resume* of the reported cases of pericardiotomy, and reports one case treated by him in this way in Israelite Hospital, Berlin. The whole number of cases thus far reported, including his own, is fifteen. Of these nine were cases of purulent pericarditis. In the others the ex-

udate was of a different nature (in two hemorrhagic, probably tuberculous). His own case was that of a laborer thirty-three years old, due to influenza-pneumonia. The symptoms were cough, nose bleeds, dyspnœa, stitch in left side, high temperature (as high as 39.4), very rapid respiration. The heart dulness when greatest extended to within one and one-half finger breadths of the angle of the scapula and over the entire left thorax in front, up to the clavicle. Over all the valves a light systolic murmur, breathing and heart tones very weak and vocal fremitus barely perceptible. A probe puncture was made in the third left intercostal space two finger breaths inside the mammary line, and a turbid fluid mixed with the threads was obtained. On microscopic examination it was found to be made up of coagula of leucocytes and cells.

Operation of pericardiotomy was performed. Incision was made, starting in at the third intercostal space—a finger breadth from left sternal edge—five cm. long. Owing to the very weak pulse, no general anæsthetic was employed—but the infiltration anæsthesia of Schleich was used. As the pericardium was cut into, a great quantity of the pus escaped. Dyspnœa disappeared at once. On the following day only little pain was felt and general condition was good. Patient was discharged from hospital three months after operation. A year after the operation the only thing noticed was a slight systolic drawing in at the apex.

Concluding the author says: In only three of the fifteen reported cases, pericarditis was the only disease diagnosed during life (cases of West and Partzeusky), for which a definite etiological factor was not given, and in the case of V. Eiselsberg, in which a stab wound was the infecting agent. Twice the pericarditis, as a primary disease was accompanied by a left-sided empyema. Acute articular rheumatism was given as the cause in one case, influenza in three, once alone, and twice accompanied by influenza-pneumonia. In remaining five cases the suppurative pericarditis must be regarded as the indication of a septico-pyæmic infection of the body, or as a metastasis of an osteo-myelitic purulent process localized in some part. Of the fifteen cases eight were cured, seven died. In only one of the fatal cases was the operation probably the cause of death, and then undoubtedly due to the mechanical shock of the sudden pressure of the solution used to wash out the pericardial sac, on an already much weakened heart and patient. The most favorable cases were those where the pericarditis was primary (so-called), or when only complicated by a left-sided pleurisy.

Bone Grafting for Ununited Fractures.

Dr. A. M. Phelps in Medical Record.

Among the causes of ununited fracture were lack of nutrition, foreign bodies between the fragments of bone, bad coaption, and sclerosis. Different methods had been resorted to with more or less success for inducing union. Thomas, of Liverpool, had suggested hammering the fracture with a mallet, then putting the limb up in plaster and allowing the patient to walk, thus grinding the ends of the bone together. Senn had suggested putting in decalcified chips of bone between the ends of the fractured bone. Another method was to turn in periosteum and pin the bones. In the cases which he had to report in his paper, eleven in number, one or more of these methods had been tried unsuccessfully before he had attempted bone grafting. His first attempt at bone grafting, different from that which he now practised, occurred about 1890, at one of the city hospitals, and was the source of a good deal of newspaper notoriety. A portion of the forearm of a dog, still retaining its nutrient attachment to the dog, was grafted into the ununited bones of a child's limb, and the two were bound together with plaster. But the dog became restless, squirmed in its plaster jacket, and it was necessary to separate it about the tenth day. The graft did not unite. He then adopted the plan which had succeeded in the patient presented and in several others. It consisted in taking numerous chips

of the forearm of a dog, preferably a pup, and grafting them into longitudinal splits of the periosteum, covering the ends of the bone which had just been cut down upon and wired together. The chips of bone started centers of ossification which resulted in good bony union. They seemed to act not unlike skin grafts on the surface of the body. In the case of the young woman presented, who had ununited fracture of the bones of the forearm, he had employed about fifty bone grafts. Subsequently about a dozen of them came to the surface and were removed, but the remainder "took." There was slight shortening of that arm, but its use and power seemed normal. In one of the successful cases the bone grafts into the arm were obtained from the knee of another patient upon whom he was doing excision. In the case of a man who had no use for his little toes because of the presence of corns, he utilized these for bone grafts into his ununited fracture. Out of the eleven cases two came to amputation, one resulted in fibro osseus union, in eight there was perfect bony union. All were of the extremities five of the leg. There were successes, there were failures. He gave the method for what it was worth. When other methods failed, he thought this one of bone grafting should be tried before resorting to amputation.

Legal Decisions Affecting Physicians.

Henry Leffmann, M.D., in Philadelphia Polyclinic.

We deem it of some interest to record from time to time decisions by courts of last resort, concerning matters affecting medical men in their business and professional relations. It will not be necessary to go into much detail nor to report more than a few of the cases, since many of them are of interest to lawyers only, and, moreover, the law has not yet become fixed in all respects, and decisions even by the most august court are to be considered as marking rather the trend than as establishing the final view. On the principle that one story is good until another is told, we may say that a decision is good until it is reversed. It has been remarked by a learned jurist that a court occasionally discovers that it has made mistakes and then either solemnly reverses itself, or so overlays the original decision with exceptions and limitations that it becomes valueless as a precedent. It must also be borne in mind that on novel questions, courts of equal standing may differ. A decision in Pennsylvania may be the reverse of that in Nebraska.

Visiting lists as Evidence of Services.—Courts have ruled that no "visiting-list" of which the entries are simply the names of patients accompanied by a succession of hieroglyphics unintelligible to a jury, and requiring to be explained and translated by the person making them, can be accepted as a book of original entries. "Allowing the utmost latitude to the plea of convenience and necessity, the law cannot tolerate as self-proving an entry of services which can be translated only by means of a glossary." Such books have been rejected in a suit for services in Pennsylvania, and the same rule prevails in other States, except, perhaps, Mississippi. "A due regard for his own interest should lead the physician to keep a book of original entries, showing a charge for attendance, with the date, the name of the person against whom the charge is made, and the amount of compensation for the services or attendance."

Sale of Practice.—An agreement for the sale of a practice for ten years, was violated by the seller returning to the place and resuming practice after four years' absence. An offer by the seller to return the amount paid him was not considered final, the Supreme Court allowing further proceedings to determine the loss likely to be sustained by the buyer by reason of the change. The Court restrained the seller from practicing in the locality until the question of damages was settled.

The Law of Libel and Slander as Affecting Physicians.—Libel consists in the utterance of any communication otherwise than by oral speech unjustifiably accusing private individuals, officials or governments of anything tending to make them ridiculous or injure them in reputation or public esteem.

Slander is an oral statement unjustifiably accusing a person of a crime, a loathsome disease, incapacity, or dishonesty, or of any fault which tends to injure the person or his business. The Courts have decided that an accusation may be slanderous or not according to the vocation of the accused. To accuse a physician of general professional ignorance or malpractice is actionable *per se* but to state that in a special case he was at fault is not slanderous, unless special damage is proved. A retired physician, since he no longer gains his living by his profession, may be accused with impunity of what would "slander" a man in actual practice. Slanderous words uttered in one State may not be actionable in another State unless proved to be so also in the place uttered. A person uttering slander to a second party who repeats it to the detriment of an individual may escape responsibility if the damages result from the utterance of the second party and not from that of the originator. In case of libel, any accusation holding a person up to scorn or ridicule, whether professionally or as a private person, is actionable. A physician who attempts to achieve notoriety by puffing himself cannot recover damages from those who further his attempts. It is slander to falsely attribute a contagious disease to a person, unless a statement was necessary and there was a mistaken diagnosis. A physician condemning any article used in medical practice is liable to the manufacturer, if the said physician's statement be incorrect.

Treatment of Simple Rectal Fistulæ.

The International Journal of Surgery.

In patients otherwise healthy the chief indication in the treatment of simple fistulæ, says Dr. W. Bodenhamer (*New York Medical Journal*), is to destroy the accidental tissue which lines their internal surface, which, when accomplished, modifies the condition of their parietes, and, together with dilating or enlarging the orifices of the passages, and complete drainage, decidedly favors granulation, cicatrization, obliteration, and cure. The chief indication may be effected by means of various escharotics, some in the form of fluids, as injections, and others in the potential form, as applications. Some of the fluids which have been used successfully in some of these cases by the writer, as well as by others, are the tincture of iodine, or, what is preferable, a solution of iodine in ether, being more volatile, escapes more rapidly, leaving the parietes of the fistulous tract in contact with the pure iodine; a strong solution of the nitrate of silver, and also the following preparations:

℞ Acidi carbolici, gr. xxx.
Glycerini, ℥ ij.
Aq. destillatæ, ℥ iv.
M Fiat solutio.

℞ Hydrarg. chloridi mitis, gr. xxx.
Hydrarg. chloridi corrosivi, gr. ij.
Mel. Despumati, ℥ j.
Aq. destillatæ, ℥ ij.
M Fiat mistura.

To suit some delicate cases these injections may be slightly diluted, and the pain, if any resulting from their use, may generally be mitigated by the application of hot fomentations or poultices. A few injections at intervals of a day or two may be all that will be required.

With regard to the application of some escharotics in the potential form, the writer has treated successfully quite a number of cases of simple and superficial anal and rectal fistulæ, in which there existed one or more straight or slightly curved fistulous tracts, by means of probes of silver or copper of different sizes and coated with caustic. The silver probe may be coated with the nitrate of silver by dipping it several times in the fused salt and introduced into the whole length of the fistulous passage; or the copper probe may be coated with the nitrate of copper by dipping it in nitric acid, and inserted like the former, the latter being the most successful application in the author's experience.

ACCORDING to Borner's medical directory the number of registered medical practitioners is 24,000.